Learning

Definition of Learning

(any relatively permanent change in behavior brought about by experience or practice)

- "relatively permanent" aspect of learning refers to learning being associated with physical changes in the brain
- although physical changes may be present we may not always be able to "get" to the information

- **discovered by Ivan Pavlov** worked with salivating dogs
  - focused on observable, measurable behavior
- **several key elements must be present and experienced**
  - **unconditioned stimulus (UCS):** original, naturally occurring stimulus that ordinarily leads to an involuntary response
  - **unconditioned response (UCR):** involuntary response to the unconditioned stimulus
  - **conditioned stimulus (CS):** previously neutral stimulus that begins to cause the same kind of involuntary response when paired repeatedly with the UCS
  - **conditioned response (CR):** response that is given to the CS

Classical Conditioning

(learning to make an involuntary response to a stimulus other than the original, natural stimulus that normally produces it)

- **basic principles for classical conditioning to occur**
  - CS must come before the UCS
  - CS and UCS must come very close together in time (< 5 sec)
  - CS must be paired with the UCS many times
  - CS must be distinct from other competing stimuli
- **key features**
  - **stimulus generalization:** response to a stimulus that is similar to the original CS
  - **stimulus discrimination:** response to different stimuli in different ways
  - **extinction:** presentation of the CS in the absence of the UCS leads to reduction in the CR
  - **spontaneous recovery:** reappearance of a previously extinguished CR
  - **higher-order conditioning:** occurs when strong CS is paired with new neutral stimulus; new previously neutral stimulus becomes a second CS
- **other features**
  - **conditioned emotional responses:** emotional responses that have become classically conditioned to occur in response to learned stimuli; based on work of John B. Watson; helps explain development of phobias
  - **conditioned taste aversion** is one situation where classical conditioning can occur quickly without repeated pairings
  - some associations are relatively quick and easy to learn due to survival value for organism (biological preparedness)
  - **vicarious conditioning** can occur by simply watching someone else respond to a stimulus

Classical Conditioning (continued)

(learning to make an involuntary response to a stimulus other than the original, natural stimulus that normally produces it)

- **Why does it work?**
  - **Pavlov**—stimulus substitution occurs where the CS comes to activate the same part of the brain that was originally activated by the UCS
  - **cognitive perspective**—organism consciously expects something to occur; CS provides information about the coming of the UCS (based on work of Rescorla)

SHOUT
SHARE
IT

Learning

focused on observable, measurable behavior

Thorndike was among the first to study learning of voluntary responses
- developed law of effect—action followed by pleasurable consequence will tend to be repeated; action followed by unpleasant consequence will tend not to be repeated

Skinner led field of behaviorism after Watson
- coined term *operant conditioning*—voluntary behavior that people and animals do to operate in the world

Operant Conditioning

(learning to make voluntary responses through the effects of positive or negative consequences)

reinforcement any event or stimulus, that when following a response increases the probability that the response will occur again
- **primary reinforcers:** satisfy basic biological needs (e.g., hunger, thirst, touch)
- **secondary reinforcers:** gain reinforcing properties through previous association with primary reinforcers
- **positive reinforcement:** addition, or experiencing of, a pleasurable stimulus
- **negative reinforcement:** removal, escape, or avoidance of unpleasant stimulus

schedules of reinforcement
- **timing of reinforcement** influences speed of learning, strength of learned response, and subsequent behavior pattern
- **continuous reinforcement:** provision of reinforcer for each and every correct response
  - easier to establish new responses but more sensitive to extinction
- **partial reinforcement:** reinforcing behavior after some but not all correct responses
  - leads to a response that is resistant to extinction
  - schedule can be specified by the pattern/ratio of responses or by time/interval
  - both ratio and interval schedules can be either fixed or variable

Operant Conditioning (continued)

(learning to make voluntary responses through the effects of positive or negative consequences)

punishment is any event or stimulus that, when following a response, decreases the probability that the response will occur again
- opposite of reinforcement, which increases the probability that the response will occur again
- punishment by application—something unpleasant is added to the situation
- punishment by removal—something pleasurable is removed
- to work—must be immediate, consistent, and paired with reinforcement of actual behavior desired

other features
- stimuli must be discriminative; specific cues lead to specific responses
- some behaviors can be established through shaping, reinforcing small steps, or each successive approximation, toward the ultimate goal
- as in classical conditioning, extinction, generalization, and spontaneous recovery can occur
- instinctive drift, or the tendency to revert to genetically controlled patterns of behavior, can serve as a biological constraint on operant conditioning

behavior modification
- application of operant conditioning principles (sometimes classical conditioning) to change undesirable behaviors and create desirable behaviors in both humans and animals
- token economies, time-out, applied behavior analysis, biofeedback, and neurofeedback use these principles

Learning

Cognitive Learning Theory

(focuses on role of cognition, or thought processes, on learning)

Tolman
worked with rats in a maze
- suggested animals form a cognitive map of the physical layout of the maze
- performance not due to reinforcement
- **latent learning:** learning occurs but behavior not manifested until organism has reason to demonstrate it

Köhler
worked with chimpanzees; set up a problem situation
- chimp first exhibited trial-and-error approach
- later appeared to experience a sudden insight into solving the problem (retrieving a banana)

Seligman
originally studied escape and avoidance learning in dogs
- discovered that the animals did nothing in a specific situation
- **learned helplessness:** tendency to fail to act to escape from a situation because of a past history of repeated failures; or according to recent work by Maier, possibly due to not learning how to relax and take control accompanied by activation of key brain structures

Observational Learning

(the learning of a new behavior through the observation of a model; typically associated with classic work of Bandura and "Bobo doll" study)

key elements for learner
- pay attention to the model
- able to remember what was done
- capable of reproducing, or imitating, the actions of the model
- have the desire or motivation to perform the action

children observing
an adult model's aggressive or nonaggressive behaviors tended to later act in the same manner they saw modeled; no reinforcement was necessary

later research suggested that potential consequences can influence motivation to imitate a particular model

5 learning

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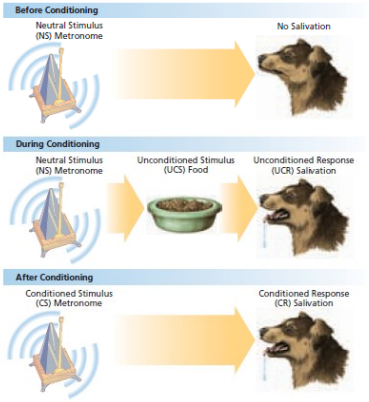
Classical Conditioning

(learning to make an involuntary response to a stimulus other than the original, natural stimulus that normally produces it)



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  - stimulus generalization
  - stimulus discrimination
  - extinction
  - spontaneous recovery
  - higher-order conditioning

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- conditioned emotional responses

- conditioned taste aversion
- vicarious conditioning
- **other features**

Classical Conditioning (continued)

(learning to make an involuntary response to a stimulus other than the original, natural stimulus that normally produces it)

- **Why does it work?**
  - Pavlov
  - cognitive perspective

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- **Thorndike** was among the first to study learning of voluntary responses
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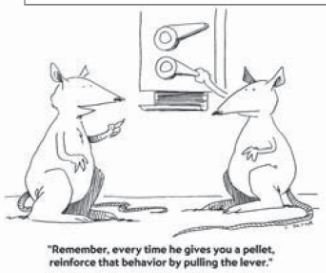

Operant Conditioning

(learning to make voluntary responses through the effects of positive or negative consequences)

- **reinforcement** any event or stimulus, that when following a response increases the probability that the response will occur again
  - primary reinforcers
  - secondary reinforcers
  - positive reinforcement
  - negative reinforcement

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Operant Conditioning (continued)

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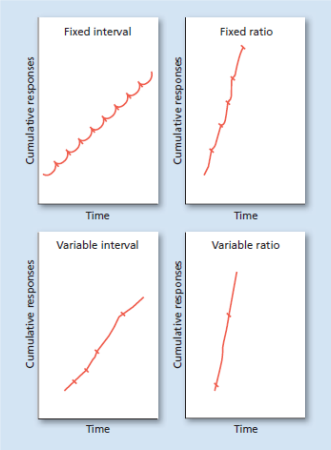
punishment is any event or stimulus that, when following a response, decreases the probability that the response will occur again



- **schedules of reinforcement**
  - timing of reinforcement
  - continuous reinforcement
  - partial reinforcement

Table 5.2

Four Ways to Modify Behavior

	REINFORCEMENT	PUNISHMENT
Positive (Adding)	Something valued or desirable	Something unpleasant
	Positive Reinforcement Example: getting a gold star for good behavior in school	*Punishment by Application* Example: getting a spanking for disobeying
Negative (Removing/Avoiding)	Something unpleasant	Something valued or desirable
	Negative Reinforcement Example: avoiding a ticket by stopping at a red light	*Punishment by Removal* Example: losing a privilege such as going out with friends

- **other features**
- **behavior modification**

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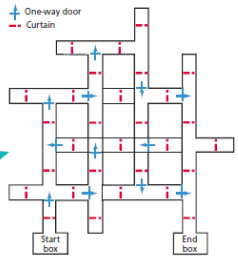

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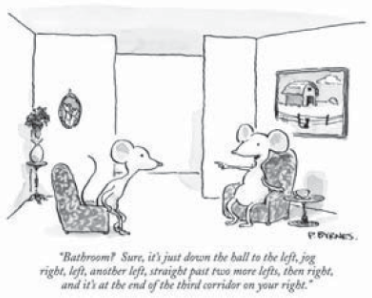
"Bathroom? Sure, it's just down the hall to the left, jog right, left, another left, straight past two more lefts, then right, and it's at the end of the third corridor on your right."

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